

tic and Gulf States; from 10th to 12th in the Upper Mississippi valley; on the 12th in the Ohio valley. In California, at Fort Yuma, on the 5th; at Calistoga on the 12th and at Princeton on the 7th and 12th. On the 15th, at Cheyenne, a heavy snow-storm, accompanied by thunder and lightning, wind NW. 44 miles.

Auroras.—But one auroral display has been extensively observed during the month. It occurred on the 7th from 7 to 10 p. m. and extended from Maine to Nebraska, being observed in the latter State at Clear Creek. Its detailed description is as follows: Cresco, Ia., 7 to 7:10 p. m., low arch in the northeast, with patches of light beneath; Monticello, Ia., at 9 p. m.; Cornish, Me., all the evening; Gardiner, Me., at 9:30 p. m., quite faint; Orono, Me., faint; Somerset, Mass., early evening, dark cloud below arch; Cambridge, Mass., 8 to 8:45 p. m.; Waltham, Mass., 7:20 to 8 p. m., faint nebulous haze; Newburyport, 7 to 10 p. m., faint above a dark segment; Clear Creek, Neb., faint; Contoocookville, N. H., 7:30 p. m., diffuse light; Grafton, N. H., 8:30 to 9:30 p. m., not very bright; Argyle, N. Y., slight diffuse light in the early part of the evening; Woodstock, Vt., 8 p. m., slight nebulous light; Newport, Vt., faint; St. Paul, 7:40 p. m., faint light and arch. Eastport, Me., 7:30 p. m., arch extended from NE. to NW. and consisting of two brilliant unbroken bands reaching 30° towards the zenith. Streamers were observed to play between the bands several times extending from one to the other. General cloudiness prevailed throughout the Lake region during that evening, which prevented observations of the display. The following isolated cases of aurora are reported. 6th, Starkey, N. Y. 9th, Arlington, Ind., 9 p. m.; New Corydon, Ind. 10th, Oregon, Mo., at 9 p. m.; Port Huron, 11th, Oregon, Mo., at 9 p. m. 17th, Vevay, Ind. 18th, Arlington, Ind., 10 p. m. 19th, Detroit, 8 p. m., quite feeble; Wellsborough, Pa. 22nd, Ft. Wayne, Ind. 24th, Wellsborough, Pa. 25th, Woodstock, Vt. 26th, Woodstock, Vt. 27th, Starkey, N. Y. 28th, New Corydon, Ind., corona appeared at 8 p. m., disappearing shortly after. Arlington, Ind. 31st, Starkey, N. Y.

Telegraphic Communication Interfered with by Atmospheric Electricity.—Santa Fé, 12th, 13th; Jacksboro, Texas, 2nd, 3rd, 5th, 10th; Fort Davis, Texas, 5th; Castroville, Texas, 3rd, 8th, 12th, 16th; Eagle Pass, Texas, 1st, 10th, Edinburg, Texas, 1st; Pembina, 1st, 11th.

OPTICAL PHENOMENA.

Solar Halos were seen in greatest numbers from the 25th to 27th, twelve on the latter date, extending from Maine westward, to Minnesota, and as far south as Virginia; but few were reported from the Gulf States.

Lunar Halos were frequently observed east of the Rocky Mountains from the 22nd to the 31st; there being no state from which one or more has not been reported.

MISCELLANEOUS PHENOMENA.

Prairie and Forest Fires.—Ft. Gibson, 14th, 17th, 19th to 23rd, 28th to 31st; Ft. Sill, 7th, 8th, 13th to 20th, 26th to 29th; Springfield, Mass., 14th 15th; Creswell, Kan., 17th to 19th, 24th to 29th; Enfield, N. H., 15th to 17th; Ft. Dodge, Iowa, 2nd 3rd, 6th, 8th, 10th, 13th, 14th, 15th; Litchfield, Mich., 1st to 18th; Mt. Solon, Va., 29th to 31st; Walnut Grove, Va., 16th; Camp Sheridan, Neb., 3rd, 4th, 5th; Ft. Randall, Dak., 5th, 8th, 9th; Ft. Hale, Dak., 5th; Mt. Vernon, Iowa, 2nd, 3d; Red Bluff, Cal., 25th to 31st, in mountains; Los Angeles, Cal., 25th; Virginia City, 5th, very extensive in Ruby Valley; Yankton, 1st, 8th, 9th, 10th, 20th; Ft. Stevenson, Dak., 5th; Deadwood, 5th, 6th, 7th 13th; North Platte, 9th, 18th, 20; Henrietta, Tex., 29th, 30th; Coleman, Texas, 19th, 20th; Pembina, 1st to 5th, 6th, 16th, to 24th; Burlington, Vt., 3rd, 4th, 13th, to 25th; In Vermont, between Camel's Hump and Mansfield Mount ains on 16th, forest fires destroyed large tracts of valuable timber; also near Plymouth, Windsor, county, large areas burned over and much lumber destroyed. Port Jervis, N. Y., 16th, in mountains. Waterbury, Vt., 14th, immense damage inflicted. Brentwood, Long Island, 16th to 18th. Weymouth, Norfolk county, Mass., 28th, over 100 acres of woodland burned. Wellsborough, Pa., during portions of the month severe forest fires have raged through the county, doing much damage; Brockville, Ont., 15th, severe bush fires raging near Westport; over 400 acres burned; other fires were reported in various parts of that and adjacent counties. Lebanon, N. H., 15th, on Grant-ham Mountain, doing great damage to valuable timber; hundreds of acres burned over. Northampton, Mass., 15th, "a severe fire has been raging in the woods north of that place during the past two days. The whole western part of the State is enveloped in dense smoke from forest fires." Concord, N. H., 15th, a large territory of woodland burned over; over two thousand cords of wood destroyed for one firm. Pembina, 1st to 7th, very extensive prairie fires doing much damage. Norfolk, N. Y., 3d forest fires raged fear fully, "destroying farm houses, barns and farm property. Some of the roads are impassable" whitestone, Long Island, 16th, "during past twenty-four hours dense clouds of smoke, from forest fires, rendered it necessary to keep the fog bells tolling from Ft. Schuyler to Executive Lights." Sparta, N. Y., 17th, large forest fires raging, destroying valuable timber, fences and orchards. Montreal, Can., 17th, "dense smoke on the river still continues and navigation is entirely suspended." Sweetwater Valley, San Diego Co., Cal., 28th, one of the greatest conflagrations "ever known to the oldest inhabitant, from 40 to 50 square miles of territory burned over."

Meteors have been seen in considerable numbers throughout the country east of the Mississippi valley, the largest number of stations reporting them as visible on the 12th and 13th. None of particular import-

ance were observed, except at Indianola on the 12th, 10:20 p. m. A very brilliant meteor started in the vicinity of Aquarius, about 25° above the horizon and moved southward. Apparent size one-fourth of the full moon, color white. When about 10° above the horizon it exploded into seven fragments, lighting up the whole southern sky as though the full moon had been present.

Earthquakes.—June 3rd, 9:32 a. m., on Atka Island, Alaska, eight sharp shocks in rapid succession, lasting about two seconds each, movement from SSE. to NNW. October 2nd, a sharp shock of earthquake was felt at 6:30 a. m. at Oakland and other places around San Francisco bay. Winsborough, S. C., 26th, a. m., slight shock. New Haven, Conn., 24th, 6.12 to 6.13 p. m., two slight shocks at intervals of 2 or 3 seconds. The shocks were felt at Bridgeport, 15 miles distant, at about the same time.

Sunsets.—The characteristics of the sky at sunset, as indicative of fair or foul weather, for the succeeding twenty-four hours, have been observed at all Signal Corps stations. Reports from 134 stations show 4,087 observations to have been made, of which 29 were reported doubtful; of the remainder 3,532, or 87.0 per cent were followed by the expected weather.

Grasshoppers.—Dayton, W. T., 1st, doing some injury to fruit and laying many eggs; October 4th, large numbers reported as appearing in Stephen's Co., Texas; Pilot Point, Tex., 17th, in large numbers, passing over station from the northwest, few alighting; 19th, disappeared; 20th, reappeared but did no damage; 21st, large wheat fields were reported destroyed 15 miles southeast of station; disappearing afterwards to the southward without depositing eggs; Jacksboro, Tex., 17th and 18th, flying south; Coleman, Tex., 17th, passing southward, very few alighting; Fredricksburg, Tex., 19th, passed southwards near station, none alighting. Ft. Sill, I. T., 28th, disappearing, very few to be seen; Melissa, Tex., 18th, myriads passing over station; 17th, Dallas, Tex., moving south in clouds, very few alighted, reported thick in counties to the west and northwest, "no damage done as yet"; Waco, Tex., "passing over city all day, and twelve miles west have appeared in myriads"; 19th, reported to be damaging wheat near Staunton, Ill.; early part of October in Parker Co., Tex., doing some damage; Shackelford Co., southern portion, "in innumerable numbers"; Erath Co., Tex., many passed "over," few alighted but did little damage; Denison, Tex., 21st, large swarms passed over station to the southwest, continuing until 3 p. m. of the 22nd; San Antonio, Tex., 24th, many passed over station to the southeast, but no destruction was heard of; Bosque Co., Tex., 25th, very plentiful, "the new wheat crop has been entirely eaten up by them."

Geese flying south at Hulmesville, Pa., 11; Visalia, Cal., 9th, 25th; Red Bluff, Cal., 3rd; Roseburg, Or., 6th, 11th; Yankton, 7th, 26th; North Platte, 30th, 21st; Bismarck, 2nd, 14th, 21st; Pilot Point, Tex., 22nd; Uvalde, Tex., 14th; Jacksboro, Tex., 22nd; Henrietta, Tex., 28th, 30th; Graham, Tex., 24th; Little Rock, Ark., 17th; Pembina, 21st, 22nd; St. Louis, 24th; Duluth, 19th, 27th.

Polar Bands.—Gardiner, Me., 26th; Freehold, N. J., 29th; Wytheville, Va., 24th; Tabor, Iowa, 1st, 2nd; Pembina, 13th, 18th, 25th; Leavenworth, 21st, 30th.

Mirage.—Olivet, Dak., 21st, 26th, 31st.

Zodiacal Light.—Pike's Peak, 24th, 5:54 P. M., a rosy yellowish light of conical shape.

Sun Spots.—The following record of observations made by D. P. Todd, Assistant, has been forwarded by Prof. S. Newcomb, U. S. Navy, Superintendent Nautical Almanac, Washington, D. C.:

DATE— SEPT., 1879.	No. of new—		Disappeared by solar rotation.		Reappeared by solar rotation.		Total number visible.		REMARKS.
	Groups	Spots.	Groups	Spots.	Groups	Spots.	Groups	Spots.	
1st, 3 p. m...	0	0	0	0	0	0	1	1	Spot much smaller.
2nd, 4 p. m...	1	9	0	0	0	0	1	9	
3rd, 4 p. m...	0	0	0	0	0	0	1	1	Faculae.
5th, 6 p. m...	0	0	0	0	0	0	0	0	Faculae.
7th, 4 p. m...	1	4	0	0	1	4	1	4	Faculae.
9th, 6 p. m...	0	12	0	0	0	8	1	14	
10th, 4 p. m...	0	0	0	0	0	0	1	19	
12th, 6 p. m...	1	4	0	0	0	0	2	17	
13th, 8 a. m...	1	4	0	4	1	4	3	17	Faculae.
15th, 4 p. m...	0	0	0	0	0	0	3	10	Faculae.
14th, 4 p. m...	0	0	0	0	0	0	3	7	Faculae.
16th, 4 p. m...	0	0	1	2	0	0	1	3	
19th, 9 a. m...	1	17	0	0	0	0	1	17	
19th, 6 p. m...	0	0	0	0	0	0	1	17	
20th, 1 p. m...	0	0	0	6	0	0	1	11	
23rd, 8 a. m...	0	0	1	11	0	0	0	0	Spots probably disappeared by solar rotation.
30th, 8 a. m...	0	0	0	0	0	0	0	0	Faculae.
31st, 8 a. m...	0	0	0	0	0	0	0	0	

Observations were also made on the 6th and 16th at 4 p. m., on the 24th, 25th, 26th and 28th at 8, 9, 10 and 7 a. m. respectively, and on the 31st at 5 p. m., but no spots were seen. Mr. David Trowbridge, at Waterburgh, N. Y., observed the sun on the 2nd, 3rd, 4th, 5th, 6th, 7th, 9th, 11th, 12th, 14th, 16th, 23rd, 24th, 25th, 26th, 29th and 30th, but saw no spots on those days. On the 19th, at 3.30 p. m., saw two groups near the west margin of the disk; one contained 2 spots and the other 3. These groups and spots were also seen on the 20th and 21st. They disappeared by rotation, presumably by the 22nd. Mr. H. D. Gowey, at North Lewisburg, Ohio, observed three large spots on the 18th, at 7.50 a. m., in the southeast quadrant.

Prof. F. Hess at Fort Dodge, Iowa, reports the following spots: 8th, 10 a. m., 3 spots in SE. quadrant;

10th, 8:30 a. m., 9 in SE. quadrant; 12th, 11 a. m., 1 in SE. quadrant; 13th, 7 a. m., 5 spots—1 in SE quadrant and 4 in NW. quadrant; 14th, 3 spots; 15th, 7 a. m., 2 in SE. quadrant; 18th, 9 a. m., 3 in NW quadrant; 19th, 4 in SW. quadrant; 20th, 5 in SW. quadrant; 22nd, 3 in SW. quadrant. No observations were made on the 9th and 11th; on the 16th and 17th the sun was hidden; on the other days of the month, observations were made but no spots seen. Prof. Hess says: "The sun spot observations were of unusual interest. At least one of the spots mentioned, namely, that observed on the 12th alone, and on the 13th, together with 4 others, and, perhaps, also some of the group of 9 spots observed on the 10th, did not disappear by solar rotation, but seemed to fade away long before they would have disappeared by rotation." Mr. William Dawson, Spiceland, Ind., noticed the following spots: 7th, one group of 4 large spots, faculæ very prominent, clouds prevented good observations; 8th, fine group of 14 spots near east edge, faculæ very beautiful; 9th, 25 spots in the group, 6 very prominent; 10th, 25 spots, one group, one spot quite large with penumbra; 11th, 20 spots, the large one having divided into 3; 12th, only 10 spots in the late group, and all small but one, another group of 8 small spots in SW. quadrant, 2 spots and faculæ at east edge; 13th, 30 spots in three groups, 10 spots in the waning group near centre, 14 spots in SW. group and 6 spots in new group at east edge; 14th, 20 spots in four groups, new group at SW. margin; 18th, 13 spots in one group in NW. quadrant, 3 large; 20th, 25 spots in two condensed groups near together, about 3' from west edge. No spots from 22nd to 31st, inclusive.

Prof. Gustavus Hinrichs, of Iowa City, Iowa, says: "A group of sun spots, comprising two very large spots, traversed the sun's disk between the 14th and 21st.

Observations were also made throughout the month at Fort Whipple, Va., but no spots were seen.

NOTES AND EXTRACTS.

Alexander Buchan, in *Nature*, October 22nd, 1879, briefly discusses the Greenwich Meteorological Observations from 1854 to 1873. He says: "There can be no doubt that in these twenty years' average we have the closest approximation to the mean monthly diurnal inequality of the barometer, in other words, to one of the prime factors of the meteorology of Greenwich. Of special interest are the results for the warmer months of the year, which class Greenwich among the places in middle and higher latitudes, whose climates are more or less continental in their character—these more special features being the occurrence of the forenoon maximum as early as 9 a. m., and a marked diminution in the amount and amplitude of the morning minimum. The almost strictly local character of the diurnal phases of atmospheric pressure, as disclosed by the observations at Greenwich, is seen from the occurrence of the a. m. maximum an hour earlier at Kew, where also the a. m. minimum becomes still less pronounced than that of Greenwich. On the other hand, at Falmouth, the a. m. minimum is much the greater of the two daily minima, and the a. m. maximum is delayed from two to three hours later than at Greenwich. Hence the true value of the Greenwich results can only be appreciated after a comparison has been made between them and the results obtained from other meteorological observatories."

"The observations of temperature are discussed with particular fulness, and the length of time is sufficient to give curves showing a diurnal inequality of temperature such as will substantially represent the curves for large portions of the south of England, not bordering the sea, where the thermometers are similarly placed to those at Greenwich."

"The curves of temperature for the different winds have also been worked out with much elaboration, and give most interesting results."

"On the average of all the months the N. wind is the coldest, the S. W. the warmest; the order as regards temperature, beginning with the coldest, is N., NE., NW., E., SE., W., S., SW.—an order, however, which differs in different months."

"In a large number of years the third barometric maximum, first noted by Rikatscheff as occurring in certain regions of the globe a little after midnight, appears in the Greenwich diurnal curves for December, January and February, less frequently in March, and seldom or not at all in the other months. The somewhat rough method which has been adopted in reducing the barometric observations to 32° unfortunately renders the evidence furnished by the Greenwich results regarding the more refined inquiries of meteorology, such as this, and the mean diurnal inequality of the barometer in the lunar months, not so satisfactory and conclusive as might have been wished."

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